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10/672,079	09/29/2003	Ehud Langberg	060707-1560	4738

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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/672,079	LANGBERG ET AL.	
	Examiner	Art Unit	
	CURTIS B. ODOM	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6-14,29-42 and 57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-14,29-42 and 57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 2, 4, 6-14, 29-42, and 57 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 4, 6-9, 13, 14, 29-37, 41, 42, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh (previously cited in Office Action 1/21/2009) in view of Long et al. (U. S. Patent No. 6, 628, 704)

Regarding claim 1, Ghosh discloses a method for reducing interference due in the frequency domain in a communication system as described in column 1, lines 10-50, the method comprising the steps of:

receiving an input signal (see Fig. 5A, r_k, column 7, lines 55-60) in the frequency domain at a frequency (television) channel (bin), as described in column 1, lines 26-36, wherein the input

signal has a short correlation time component (co-channel interference and AWGN as described in column 5, lines 19-42) and a long correlation time component (transmitted symbol sequence);

attaining near zero correlation (by decorrelation) for the short correlation time component (see column 5, lines 38-42), wherein attaining near zero correlation for the short correlation time component comprises generating a delayed signal by delaying the input signal by a time-symbol value D (as described in column 5, lines 38-42), wherein D is an integer;

generating a prediction signal output from filter 40 (of Fig. 5A) with long correlation properties (the digital signal as described in column 5, lines 19-29) based at least in part on the delayed signal;

comparing the input signal and the prediction signal at element 41 of Fig. 5A; and reducing a variance (error) between the input signal and the prediction signal by adjustment of the filter using LMS as described in column 5, lines 42-46 and column 5, line 66-column 6, line 26.

Ghosh does not disclose the method/system reduces interference caused by handshake tones in a transceiver within the communication system. However, Long et al. discloses an ADSL transceiver (see Fig. 1) which includes equalizers (FEQ and TEQ) to characterize and compensate distortion (see column 6, lines 28-39) wherein the distortion includes NEXT and FEXT caused by handshake tones/symbols sent during the handshaking period (see column 9, line 51-column 10, line 24). The NEXT and FEXT noise are characterized (see column 11, lines 6-65) and the inter-symbol interference is eliminated (see column 12, lines 27-46). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to implement the method of Ghosh to reduce interferences such as NEXT and FEXT caused by

handshake tones as described by Long et al. to remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19.

Regarding claim 2, Long et al. further discloses short correlation interferences (NEXT and FEXT) and distortions affect ADSL signals of an ADSL transceiver (see column 1, lines 14-33 and column 2, liens 15-31) at predetermined bin (carrier) of a predetermined symbol period (see column 6, lines 27-39). It would have been obvious to implement the method/apparatus of Ghosh to reduce short correlation component interferences such as NEXT and FEXT as described by Long et al. to remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19.

Regarding claims 4 and 6-9, Long et al. further discloses a symbol in an ADSL system can represent 512 time domain samples/bits (column 1, lines 27-33); equalizers (FEQ and TEQ) to characterize and compensate distortion (see column 6, lines 28-39) wherein the distortion includes NEXT and FEXT caused by handshake tones/symbols sent during the handshaking period (see column 9, line 51-column 10, line 24), wherein the NEXT and FEXT noise are characterized (see column 11, lines 6-65) and the inter-symbol interference is eliminated (see column 12, lines 27-46); and ADSL communication includes both customer premises equipment (ATU-R) and central office equipment (ATU-C) as described in column 2, lines 1-5. It would have been obvious to implement the method/apparatus of Ghosh to reduce short correlation component interferences such as NEXT and FEXT in ADSL as described by Long et al. to remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19 of Ghosh.

Regarding claim 13, Ghosh discloses the step of reducing is performed by an LMS algorithm as described in column 5, lines 42-46 and column 5, line 66-column 6, line 26.

Regarding claim 14, Ghosh discloses the input signal is correlated to a broad band noise signal (see column 5, lines 48-60).

Regarding claim 29, Ghosh discloses a system for reducing interference (Fig. 5A) comprising:

an input for receiving an input signal (see Fig. 5A, r_k) in the frequency domain, wherein the input signal has a short correlation time component (co-channel interference and AWGN as described in column 5, lines 19-42) and a long correlation time component (transmitted symbol sequence);

a delay module for generating a delayed signal (see Fig. 5A, block 42) by delaying the input signal by a time-symbol value D which is sufficiently large enough (wherein it is the understanding of the Examiner that delay must at least be equal to the upper bound to deocorrelate the signal) to decorrelate the short time component (as described in column 5, lines 38-42);

a filter for generating a prediction signal (Fig. 5A, block 40) with a high correlation value (the digital signal as described in column 5, lines 19-29) based at least in part on the delayed signal;

wherein the input signal and the prediction signal are compared at element 41 of Fig. 5A; and a variance (error) between the input signal and the prediction signal is reduced by adjustment of the filter using LMS as described in column 5, lines 42-46 and column 5, line 66-column 6, line 26.

Ghosh does not disclose the method/system reduces interference caused by handshake tones. However, Long et al. discloses an ADSL transceiver (see Fig. 1) which includes equalizers (FEQ and TEQ) to characterize and compensate distortion (see column 6, lines 28-39) wherein the distortion includes NEXT and FEXT caused by handshake tones/symbols sent during the handshaking period (see column 9, line 51-column 10, line 24). The NEXT and FEXT noise are characterized (see column 11, lines 6-65) and the inter-symbol interference is eliminated (see column 12, lines 27-46). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to implement the method of Ghosh to reduce interferences such as NEXT and FEXT caused by handshake tones as described by Long et al. to remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19.

Regarding claim 30, Long et al. further discloses short correlation interferences (NEXT and FEXT) and distortions affect ADSL signals of an ADSL transceiver (see column 1, lines 14-33 and column 2, liens 15-31) at predetermined bin (carrier) of a predetermined symbol period (see column 6, lines 27-39). It would have been obvious to implement the method/apparatus of Ghosh to reduce short correlation component interferences such as NEXT and FEXT as described by Long et al. to remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19.

Regarding claim 31, Ghosh discloses the delay value is a time symbol value D (see column 5, lines 38-42).

Regarding claims 32-37, Ghosh discloses the delay value can be D predetermined time-symbols (see column 5, lines 38-40). Long et al. further discloses a symbol in an ADSL system

can represent 512 time domain samples/bits (column 1, lines 27-33); equalizers (FEQ and TEQ) to characterize and compensate distortion (see column 6, lines 28-39) wherein the distortion includes NEXT and FEXT caused by handshake tones/symbols sent during the handshaking period (see column 9, line 51-column 10, line 24), wherein the NEXT and FEXT noise are characterized (see column 11, lines 6-65) and the inter-symbol interference is eliminated (see column 12, lines 27-46); and ADSL communication includes both customer premises equipment (ATU-R) and central office equipment (ATU-C) as described in column 2, lines 1-5. It would have been obvious to implement the method/apparatus of Ghosh to reduce short correlation component interferences such as NEXT and FEXT in ADSL as described by Long et al. to remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19 of Ghosh.

Regarding claim 41, Ghosh discloses the error is reduced by an LMS algorithm as described in column 5, lines 42-46 and column 5, line 66-column 6, line 26.

Regarding claim 42, Ghosh discloses the input signal is correlated to a broad band noise signal (see column 5, lines 48-60).

Regarding claim 57, Ghosh discloses a system (Fig. 5A) comprising:

means for receiving an input signal (see Fig. 5A, r_k) in the frequency domain, wherein the input signal has a short correlation time component (co-channel interference and AWGN as described in column 5, lines 19-42) and a long correlation time component (transmitted symbol sequence);

means for generating a delayed signal (see Fig. 5A, block 42) by delaying the input signal by a time-symbol value D (as described in column 5, lines 38-42), wherein D is an integer,

wherein the input signal is received at a frequency (television) channel (bin), as described in column 1, lines 26-36, at time-symbol D, and wherein the delay is based on an upper bound (sufficiently large) of the short correlation time component to decorrelate the component as described in column 5, lines 38-50.

means for generating a prediction signal (Fig. 5A, block 40) with a high correlation value (the digital signal as described in column 5, lines 19-29) based at least in part on the delayed signal;

means for comparing the input signal and the prediction signal at element 41 of Fig. 5A; and

means for reducing a variance (error) between the input signal and the prediction signal by adjustment of the filter using LMS as described in column 5, lines 42-46 and column 5, line 66-column 6, line 26.

Ghosh does not disclose the method/system reduces interference caused by handshake tones. However, Long et al. discloses an ADSL transceiver (see Fig. 1) which includes equalizers (FEQ and TEQ) to characterize and compensate distortion (see column 6, lines 28-39) wherein the distortion includes NEXT and FEXT caused by handshake tones/symbols sent during the handshaking period (see column 9, line 51-column 10, line 24). The NEXT and FEXT noise are characterized (see column 11, lines 6-65) and the inter-symbol interference is eliminated (see column 12, lines 27-46). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to implement the method of Ghosh to reduce interferences such as NEXT and FEXT caused by handshake tones as described by Long et al. to

remove co-channel interferences (see Ghosh, column 5, lines 19-21) which cause interference with a desired signal as described in column 2, lines 15-19.

4. Claims 10-12 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh (previously cited in Office Action 1/21/2009) in view of Long et al. (U. S. Patent No. 6, 628, 704) and in further view of Bergmans (previously cited in Office Action 4/1/2008).

Regarding claims 10-12 and 38-40, Ghosh and Long et al. do not disclose the prediction signal is generated by a causal filter which uses historical data or one past disturbance to generate the prediction signal.

However, Bergmans discloses a causal filter (see Fig. 2B, feedback (FB) filter) which provides a signal (prediction) used to cancel interference in an input signal (see column 5, lines 4-20), wherein the signal output from the filter is determined by past symbol decisions (see column 5, lines 12-20). Bergmans further discloses the filter has a causal impulse response which includes prior (history) knowledge of the transfer characteristic (noise) of the transmission channel (see column 9, lines 35-47). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the filter of Ghosh. and Long et al. with the causal filter of Bergmans to cancel inter-symbol interference using the past signal data (see column 4, lines 44-53).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CURTIS B. ODOM whose telephone number is (571)272-3046. The examiner can normally be reached on Monday- Friday, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Curtis B. Odom/
Primary Examiner, Art Unit 2611
July 13, 2009